
Mapping genes to chicken microchromosome 16 and discovery of olfactory and scavenger receptor genes near the major histocompatibility complex.

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Public Summary:

Trisomy mapping is a powerful method for assigning genes to chicken microchromosome 16 (GGA 16). The single chicken nucleolar organizer region (NOR), the 2 major histocompatibility complex regions (MHC-Y and MHC-B), and CD1 genes were all previously assigned to GGA 16 using trisomy mapping. Here, we combined array comparative genomic hybridization with trisomy mapping to screen unassigned genomic scaffolds (consigned temporarily to chrUn_random) for sequences originating from GGA 16. A number of scaffolds mapped to GGA 16. Among these were scaffolds that contain genes for olfactory (OR) and cysteine-rich domain scavenger (SRCR) receptors, along with a number of genes that encode putative immunoglobulin-like receptors and other molecules. We used high-resolution cytogenomic analyses to confirm assignment of OR and SRCR genes to GGA 16 and to pinpoint members of these gene families to the q-arm in partially overlapping regions between the centromere and the NOR. Southern blots revealed sequence polymorphism within the OR/SRCR region and linkage with the MHC-Y region, thereby providing evidence for conserved linkage between OR genes and the MHC within birds. This work localizes OR genes to the vicinity of the chicken MHC and assigns additional genes, including immune defense genes, to GGA 16.

Scientific Abstract:

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